Embedded Sensors for Composite Bonded Repair Patches

Materials Technology and Processes Group

Composites Technology and Performance

Objectives: To evaluate the effectiveness of sensors embedded within composite bonded repair patches to measure the progression of damage within the repair. Develop a generic specimen and share assets available to each of the participating nations in their complementary investigations.

Payoff: Study showed the feasibility of using embedded sensors for in situ health monitoring of composite bonded repair systems. Assisted in the development of an in situ health monitoring system to be trialed on an aircraft and a maritime platform.

Generic specimen

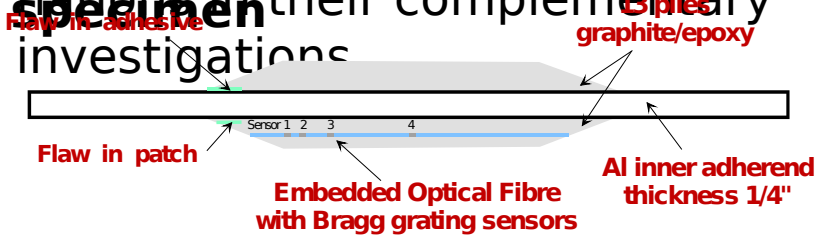
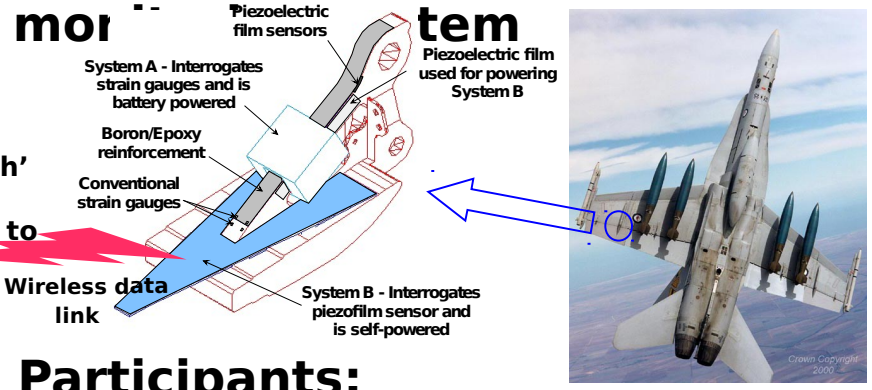
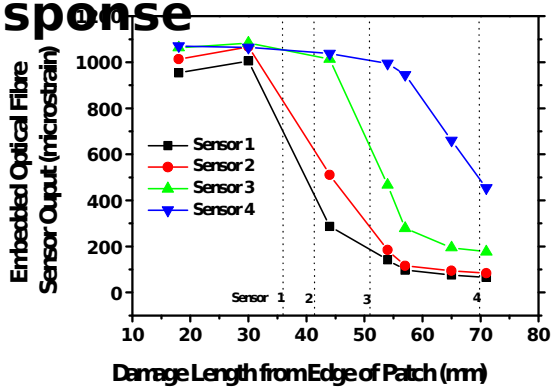

Flaw in adhesive
8 plies graphite/epoxy
Sensor 1 2 3 4
Flaw in patch
Al inner adherend thickness 1/4"
Embedded Optical Fibre with Bragg grating sensors

Illustration showing the F/A-18 flight demonstrator of a patch with an in situ health monitoring system


Piezoelectric film sensors
Piezoelectric film used for powering System B
System A - Interrogates strain gauges and is battery powered
Boron/Epoxy reinforcement
Conventional strain gauges
'Patch health' data transmitted to an external device.
Wireless data link
System B - Interrogates piezofilm sensor and is self-powered

Embedded sensor response



Participants:

DSTO **NRC**

DSTL / QinetiQ

http://www.dtic.mil/